

INSTALLATION GUIDE

9752

HARDWIRED CONTROL UNIT

9752 Hardwired Control Unit Installation Guide

This document applies to control panels using software version 4.x and 5.x.

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1. INTRODUCTION

About this Manual

This manual is divided into three chapters:

1. Introduction: this describes the parts of an Intruder Alarm System (IAS) based on the 9752 control unit.
2. Technical description: this defines the operating parameters of the different parts of the system.
3. Installation: this explains the tasks involved in installing an IAS using the 9752 control unit.

The control unit is designed to be fully programmable to suit individual user and site requirements. Installers can program units either from a keypad or using a program called Downloader on a PC running Windows (Windows XP or Vista). When programming from a keypad, instructions are entered using the three-digit commands described in the Programming Guide.

Features of the Control Unit

The control unit provides:

- Connections for 8 Fully Supervised Loop (FSL) zones or 8 Closed Circuit Loop (CCL) zones with a common tamper.
Separate expander units enable a further 24 zones to be connected: a combination of wired and radio expanders can be used.
- Connections for 3 fully programmable panel outputs.
- A connector for downloading from a local PC.
- A 4-wire bus for keypads, a keyswitch and hardwired or radio expanders.
- Internal sounder loudspeaker output with Chime, Alarm, Fire and Entry/Exit tones (the volume of the Entry/Exit and Chime tones can be adjusted).
- Built-in communicator for reporting to an Alarm Receiving Centre (ARC).
- 8 programmable plug-by outputs (for connecting a standalone communication device).
- Alarm Abort and Alarm Confirmation outputs (to reduce the likelihood of false alarms).
- Facility to download from a remote PC via a telephone line.
- Support for a range of European countries and languages.
- Fully programmable operation for zones, levels and partitions.
- Flexible reporting formats and communication configurations.
- Installer-programmable Engineer and Guard Codes.
- Support for up to 50 separate users.

User facilities include:

- 4 different security levels, which can be programmed by the Installer either as a full set and 3 part sets, or as 4 independent partitions.
- Proximity tag reader for setting and unsetting the system.
- Dual key alarms from the keypads (Panic Alarm, Medical and Fire).
- Remote Panic Alarm input to 9941 and 9943 keypads.
- Remote set/unset when using a radio expander.
- User-programmable Duress Code.

Test facilities include:

- 700-entry event log.
- Output test commands.
- Engineer walk test command.

Elements of the IAS

An IAS comprises a control unit in a shielded case, with 1 to 4 separate keypads and various detectors, transmitters and other devices connected to programmable zones. If required, a keyswitch can be connected to a zone.

Each control unit has zone connectors on its printed circuit board (PCB).

Separate expanders enable more zones to be connected: each hardwired expander adds up to 8 wired zones and each radio expander adds up to 8 or 16 wirefree zones (depending on the model used).

The control unit has 8 zones as standard, expandable to a maximum of 32.

Figure 1 shows how these elements are connected. In this example, the control unit (14) is directly connected to 6 detectors and 2 door contacts.

Further zones are then connected to it through a hardwired expander (9) and a radio expander (4). There are 4 keypads (7 and 11) on the bus.

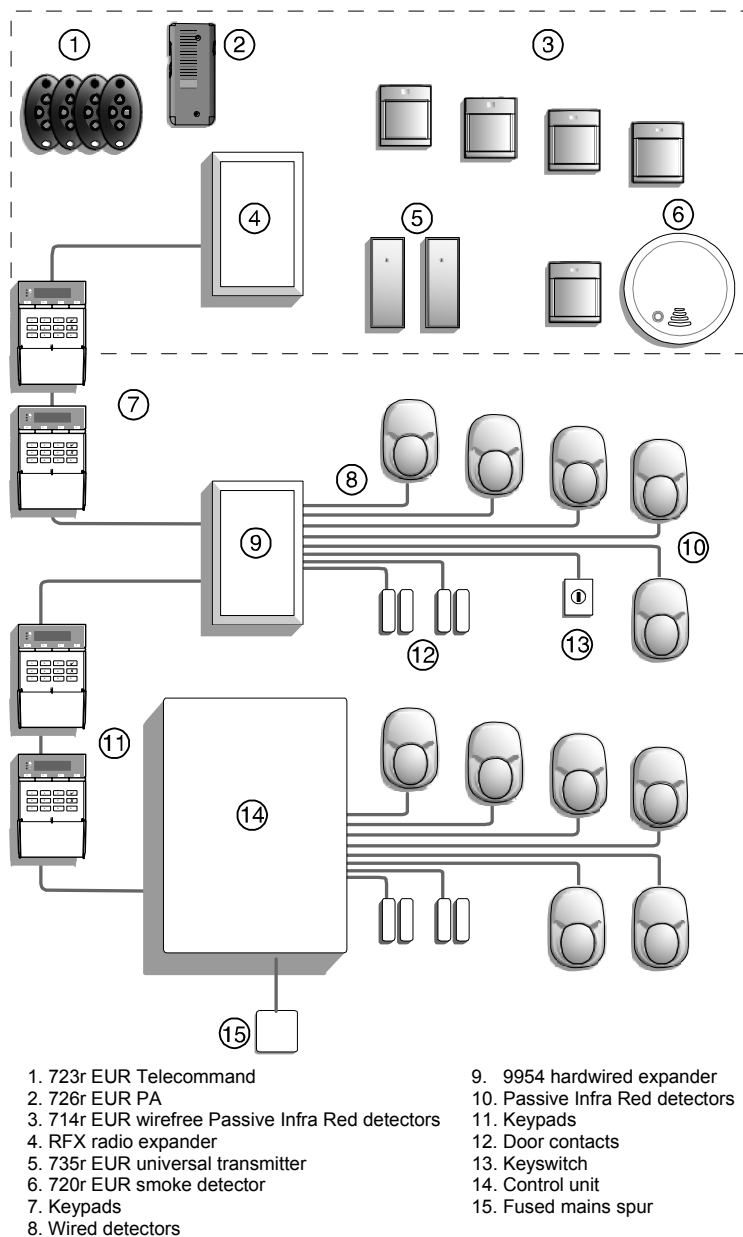


Figure 1. Elements of an Intruder Alarm System

9941 and 9943 Keypads

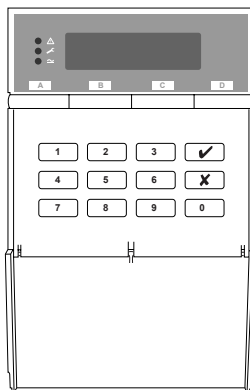





Figure 2. 9941 and 9943 Keypads

The control unit supports the connection of 9941 and 9943 keypads. The 9943 has a built-in wide-area proximity reader and connections for an external panic alarm switch. Both have a two-line 16-character Liquid Crystal Display (LCD) that can display alarm information, programming settings and other information. There are three LEDs that have the following functions.

Note: Depending on how the system is set up, the LEDs may not operate until a user code is presented.

-  Alert lamp – Flashes to highlight unacknowledged alert, glows for acknowledged conditions, and goes out when all conditions have been rectified.
-  Service lamp – Glows if the system needs an installer reset.
-  Mains lamp – Glows when using mains power. Flashes when using the stand-by battery.

Expanders

You can attach up to three hardwired or radio expanders to the control unit to expand the number of zones to a maximum of 32. You can use a combination of the two types.

Hardwired Expanders

The 9954 hardwired expander enables you to connect wired detectors to the control unit. Wired detectors can be connected in the following ways:

1. Four-wire Closed Circuit Loop (CCL).

2. Two-wire Fully Supervised Loop (FSL).

Radio Expanders

Radio expanders enable you to connect wirefree devices to the control unit. They can work with the following devices:

- **703r.** Four channel programmable transmitter, when used in two door contact mode only.
- **710r.** A compact, long range, two button PA transmitter.
- **713r and 714r.** These are Passive Infra-Red (PIR) movement detectors. The 713r has a detection range of 10m and is pet tolerant (up to 25kg size animals). The 714r has a greater radio range, and has a detection range of at least 15m. The detectors have a three-minute lockout time after detection, which lengthens battery life.
- **720r.** A smoke detector.
- **722r/727r.** A keyfob sized telecommand with two button PA transmitter (not PD6662 compliant). The 727r version uses encrypted codes.
- **723r/728r.** Remote setting device (also known as a "telecommand") that can be used to full set, part set or unset the system. The 728r version uses encrypted codes.
- **726r.** A hand held radio transmitter that can be used to start a PA.
- **734r.** A universal transmitter that can be used as a door contact or for connecting hardwired inputs.
- **738r.** A Spyder shock sensor with transmitter.
- **739r.** A radio transmitter that fits into a break-glass detector. The -00 version is the transmitter only. The -50 version comes with a break glass detector.
- **790r.** A Radio Strength Monitor, which can be used in conjunction with a 734r.

The RFX08 radio expander can handle eight wireless detectors, while the RFX16 can handle 16 detectors. The units support eight Telecommands and/or PA transmitters in addition to the eight or 16 radio detectors.

The radio expanders communicate with the control unit using the same wiring as the keypads. The radio detectors operate on 868.6625MHz, which is a dedicated frequency for intruder alarms and reduces the possibility of interference from other radio services.

Each radio detector and remote setting device contains a digital identity code that the RFX unit "learns" during installation. The code is one of over 16 million possibilities. This ensures that the RFX unit will not respond to any other detectors or remote setting switches apart from the ones it has learned. For more information, refer to the appropriate "Installation and Programming Guide" for the radio expanders you are using.

Partitioned or Single System

During installation, the Installer can configure the system as a partitioned system or as a single system.

In a single system, the control unit has one full set level (security level A) and three part set security levels (levels B, C and D). Users can set only one level at a time. Level A sets the whole system. Levels B, C and D set parts of the system. The Installer allocates zones to levels, but all keypads operate the entire system. There is only one sounder output for the whole system, and you can use a loud-speaker for setting tones and local alarms. All users belong to the whole system.

When working as a partitioned system, the control unit effectively provides four smaller alarm systems. Within a partitioned system:

- Each partition can be set, unset or in alarm independently of the others.
- You can assign individual keypads to one or more partitions. The keypads can only set or unset the partitions to which they are assigned.
- Each partition can have its own Bell and Strobe Set output.
- Zones can be assigned to more than one partition; for example, an entry door zone may be shared by several companies using separate partitions.

You can set up the control unit as a single or partitioned system using Command 98 (this will also restore the control unit to factory defaults).

For an overview of the programming steps required to set up a partitioned system, see Chapter 4 in the Programming Guide.

User Control

The control unit provides 50 independent User access codes and a separate Duress Code. Users can change these codes at any time but cannot use them to program the system. During installation, the Installer can select whether access codes use four or six digits.

2. TECHNICAL DESCRIPTION

Control Unit Specification

General

Environmental	Class 2
Security	EN50131-1 or PD6662 Grade 2
Operating temperature	-10° to +55°C
Humidity	96% RH
Dimensions	300mm W, 390mm H, 95mm D
Weight	5.0 kg
Internal Clock	±10 minutes over one year (depending on the accuracy of the mains supply frequency).
Radio detector differs	16,777,214 (2 ²⁴ -2)

Suitable for use in a system that is designed to comply with EN50131-1, ACPO-IAS Policy, NSI NACP14.

This equipment is compliant with EN 50136-2-1 and EN 50136-2-2. It allows the alarm transmission system to meet the performance requirements of prEN 50131-1: 2004 ATS 2 provided that:

- a) It is installed in accordance with the installation instructions.
- b) The connected PSTN is functioning normally.
- c) The ARC is adequately equipped.

Power Supply

All currents accurate to ±5%.

Mains power supply	230VAC +10%/-15%, 200mA max, 50Hz ±5%
System power supply	Type A. 13.8VDC, 1.0A
Battery charge current limit	250mA

To comply with the requirements of EN50131, the total current taken from the power supply, not including the battery recharge current, but including auxiliary outputs and other devices, must not exceed 750mA.

Nominal power requirements (DC):

9752	130mA quiescent, 220mA active
9941	20mA quiescent, 60mA backlight on
9943	30mA quiescent, 70mA backlight on
9954	20mA typical, 30mA maximum
RFX08/16	55mA

Standby battery (not supplied) 12V rechargeable lead-acid, gel-type battery.
 Low battery voltage cutoff = 10V.
 Recommended manufacturers: Yuassa, Yucel
 or Fiamm.

Note: Grade 1 and 2 compliance requires the panel to continue for a minimum period of 12 hours on a standby battery. To calculate the minimum capacity battery to achieve this requirement, determine the total current taken by external devices and the panel and multiply by 12. Cooper Security Ltd recommend that you fit at least a 7Ah battery.

The maximum recharge time for a 17Ah battery is 72 hours (complies with Grade 1 and 2 requirements). A lower capacity battery will take less time to charge.

Outputs

OP 1 and 2	Voltage-free, single-pole relay contacts, rated 24VDC @ 1A.
OP3	Open-collector transistor output, 500mA, 12VDC, negative applied.
LS	Supports two parallel-connected, externally mounted loudspeakers for internal sounder or EE tones: minimum speaker impedance 16Ω.
AUX	500mA, 12VDC minimum, 13.8VDC maximum, ripple ±2% maximum.
Communications outputs	12V logic outputs, negative applied in alarm (positive removed), 50mA maximum.

Inputs

TR	Tamper return for Bell
Tellback/Remote reset**	+12V applied to operate reset.
Line Fault input**	+12V applied to indicate line failure.

** *These inputs appear as pins on the connector for the plug-by communicator. See page 34.*

Fuses

The control unit uses fast-acting polyswitch fuses for overcurrent protection:

F1 – 12V AUX output	F2 – Battery output
F3 – Bus 1	

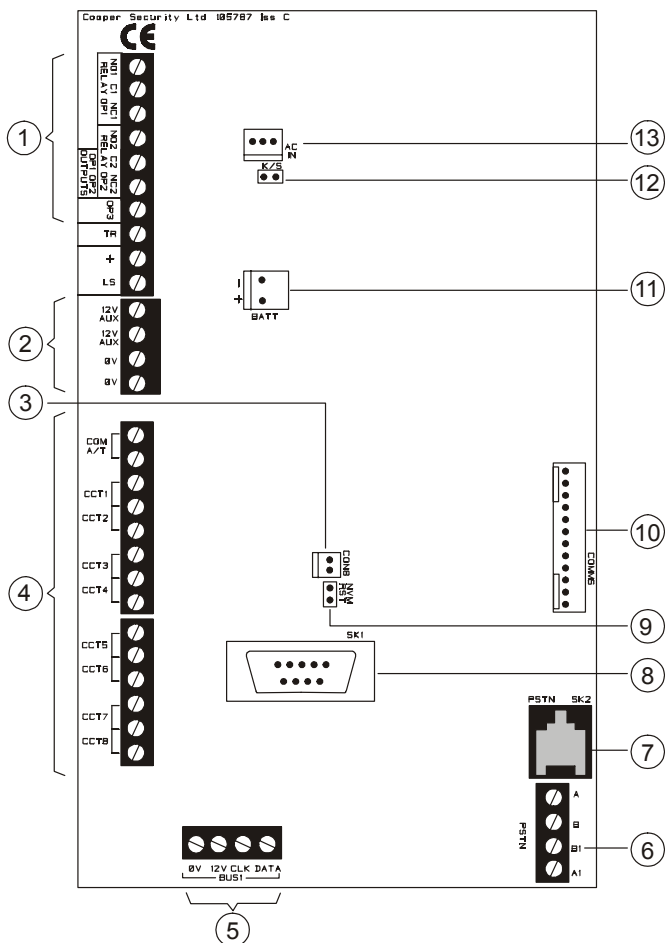
*Note: Polyswitch fuses automatically reset when the load is entirely removed.
 The control unit uses a T-250mA mains fuse.*

Compatible Equipment

703rEUR-00	Programmable four channel transmitter
710rEUR-00	Long range, compact, dual button PA transmitter
713rEUR-00	Pet tolerant wireless PIR detector (10m range)
714rEUR-00	Wireless PIR detector (15m range)
720rEUR-00	Wireless Smoke Detector
722rEUR-00	Wireless, key fob, two button PA (PD6662:2004 non compliant)
723rEUR-00	Wireless remote setting device (telecommand)
726rEUR-50/60	PA transmitter
727rEUR-00	Encrypted code, key fob, two button wireless PA (PD6662:2004 non compliant)
728rEUR-00	Encrypted code wireless remote setting device
726rEUR-00	Two-button handheld wireless panic alarm (PA)
734rEUR-00	CC door contact transmitter
734rEUR-01	FSL door contact transmitter
738rEUR-00	Wireless Spyder shock sensor (-01 version brown case)
739EUR-00	Central break glass detector transmitter interface.
739EUR-50	Glass break detector transmitter
790rEUR-00	Radio strength monitor
Proxtagpk5	Pack of five proximity tags
958EUR-00	Windows Mk3 Downloader PC software
9941EN	LCD keypad without PROX interface
9943EN	LCD keypad with built in PROX detector
9954EN-00	Hardwired 8-Zone Expander (supports three-resistor anti-masking)
RFX-08	868MHz "Class VI" Radio Expander (8 Zones)
RFX-16	868MHz "Class VI" Radio Expander (16 Zones)
XCELR	Wireless PIR detector (12m range)
XCELRPT	Wireless PIR detector (pet tolerant)
XCELW	Wired PIR detector (12m range)
XCELWPT	Wired PIR detector (pet tolerant)

Control Unit PCB Layout

Figure 3 shows the layout of the PCB used in the control unit.



- | | |
|---|---|
| 1. Outputs (2 voltage free; 1 open collector) | 9. NVM Reset pins |
| 2. AUX power | 10. Plug-by (standalone) communicator connector |
| 3. Lid tamper connector | 11. Battery connector |
| 4. Zone connectors | 12. Kick Start pins |
| 5. Keypad and expander bus (bus 2 not fitted) | 13. 21VAC from transformer |
| 6. Telephone line terminals for built-in communicator | |
| 7. Telephone line socket for built-in communicator | |
| 8. Local Downloader connector | |

Figure 3. Control Unit PCB Layout

3. INSTALLATION

Caution: Always remove mains power before opening the case lid. Do not work inside the control unit with mains power present.

Overview

A typical installation comprises the following main steps:

1. Survey the site and decide on positions for wired detectors, 9954 wired expanders, control unit, keypads, external and internal sounders. As part of the survey ask the users what facilities they need.
2. If you are going to use wirefree detectors, carry out a radio site survey and decide on positions for the wirefree detectors and the radio expanders. For more information, refer to the "Installation and Programming Guide" for the expander you are using.
3. Ensure that there is a suitable mains supply present at the site of the control unit.
4. If you are going to use a communicator, arrange for a PTT (Public Telephone and Telegraph) connection point near to the control unit.
5. Install the wired detectors and run cables to the site of the control unit or 9954 wired expanders. Connect each detector to its cable.
6. Run cables from the sites of the keypads, expanders, and external and internal sounders to the site of the control unit.
7. Install keypads and expanders, and connect them to their cabling. Ensure that each one has the correct address setting.
8. Install internal and external sounders and connect them to their cabling.
9. Install the control unit and connect it to the mains supply cabling. Do not apply power at this point.
10. At the control unit, complete all connections to keypads, expanders and sounders.
11. Apply power and program the control unit.
12. Let the radio expanders learn the wirefree detectors and then install the detectors at their selected sites.
13. Test that the intruder alarm system operates as required.
14. If required, install a communicator, connect it to the PTT network and check that it operates correctly.
15. Hand the system over to the users and instruct them in its use.

Cabling for Keypads and Expanders

Cooper Security recommends that you use 8-core 7/0.2 or 16/0.2 alarm cable for wiring keypads and expanders. You can connect the keypads and expanders in either a star or bus configuration (see Figure 4). If you intend to use long cable runs, Cooper Security recommends that you use star wiring with no more than 200m of cable per branch.

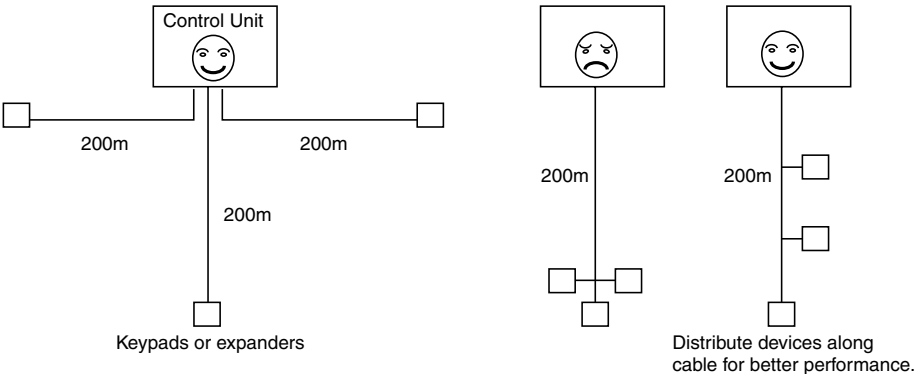


Figure 4. Star and Bus Wiring for Keypads and Expanders

The maximum length of any one run from the control unit to the most remote keypad or expander depends on the number of items connected to the cable. You can double the maximum length for 7/0.2 cable by using two cores each for the 0V and 12V terminals or by using 16/0.2 cable. The table below shows the maximum recommended cable lengths in metres for 7/0.2 cable, assuming that you connect all items at the end of a single cable run. (An item is either a keypad or an expander.) You may be able to improve on these figures by spreading items along the cable length (Figure 4).

8-core 7/0.2 cable		
Number of items	1 core	2 cores on 0V and 12V
One	200	—
Two	100	200
Three	65	130
Four	50	100
Five	40	80
Six	33	66
Seven	28	56
Eight	25	50

It is possible to extend the keypad cable run by using additional power supplies, but only up to the recommended maximum of 200m.

When carrying out the cabling, there are two important points to remember:

1. Do not connect anything other than keypads or expanders to the bus. The keypad bus power supply is limited to a maximum of 400mA.
2. Check between 0V and 12V on the keypad bus at the point furthest from the control unit: the voltage must be at least 12.0VDC when all the keypad backlights are on.

Note: The following instructions assume that you have already run all the necessary cabling.

Fitting the System

Fitting the Control Unit Case

1. Remove the control unit case from its packaging.
2. Remove the front screws and slide off the case lid.
3. The upper part of the case back has a central keyway. Mark and drill a hole for the keyway. Temporarily fix the case back to the wall. Mark the position of two more fixing holes, remove the case back and drill the holes.
4. Refit the case back to the wall using screws no less than 30mm x No 8, with dome or pan heads.

Fitting a 9941 or 9943 Keypad

Note: If you are fitting more than one 9943 keypad to a control unit then make sure that there is at least 1m distance between individual 9943 keypads. Beware of mounting 9943's back to back on opposite sides of a wall. When 9943 keypads are closer than 1m to each their prox tag readers interfere, and neither keypad can read prox tags.

Figure 5 shows the backplate and the position of mounting holes.

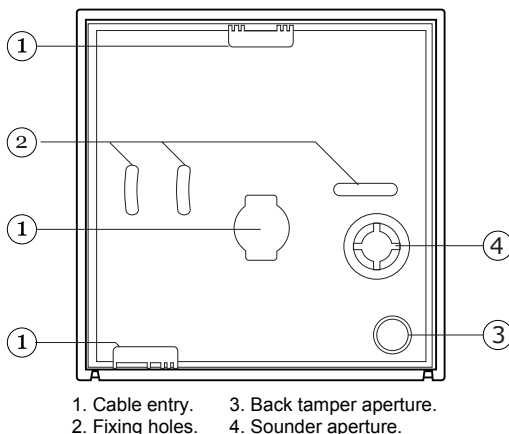


Figure 5. Backplate of the 9941/9943 Keypad

Cooper Security recommend that you mount the keypad using No 8 or 6 screws (M4/M3.5) as follows:

1. Select which cable entry you are going to use and break out the appropriate plastic sections.
2. Hold the backplate in place against the wall and mark the position of one fixing hole.
3. Drill and plug the hole, and screw the backplate to the wall. Do **not** tighten the screw completely home.
4. Make sure the backplate is level and mark, drill and plug another fixing hole. Tighten the fixing screws.
6. Mount the front of the keypad (containing the keypad pcb) onto the backplate and make sure that the tamper switch operates.

Wiring the Control Unit

Cable Entries

The control unit case back provides several cable entries. It is designed to stand away from the wall to leave space for the cables.

Mains Connection

Connect the control unit to a suitable supply using a double pole disconnect device in accordance with EN60950-1:2001 Clause 3.4.3. Connect the supply to the control unit using the 3-way terminal block located on the case back. Secure the cable to the case anchor point using the cable tie provided.

Notes:

1. *The control unit has a T-250mA internal mains fuse.*
2. *All electrical connections should be carried out by a qualified electrician.*

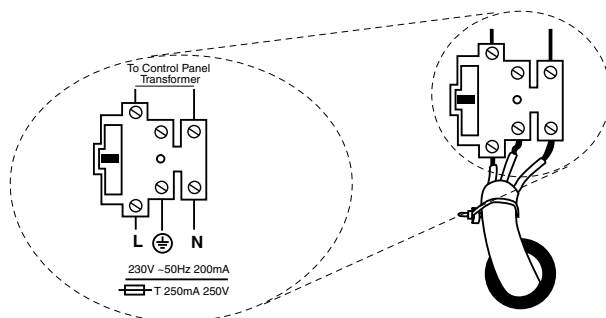


Figure 6. Mains Connection

Connect the 21VAC lead from the mains transformer to the main PCB. See Figure 3 for the location of the 21VAC connector.

Caution: Do not apply mains power at this point. Do not work inside the control unit case when mains power is present.

Keypads

Connecting Keypads

Figure 7 shows the connections for keypads. Use the "ET" connector terminals on the keypad PCB to connect an exit terminate button or lock switch. If you are using a lock switch, do not connect any other devices to these terminals.

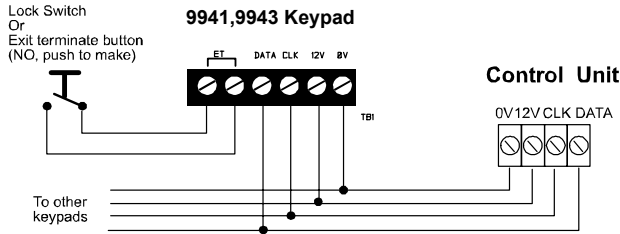


Figure 7. Keypad Connections

The 9941/9943 keypads can be connected to an external panic attack button, as shown in Figure 8. If the panic attack does not contain a tamper switch, link the pair of "EXT TAMPER" terminals. Separately link both pairs of terminals if no panic button is used.

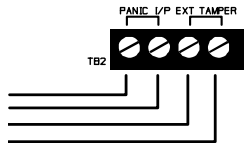


Figure 8. 9941/9943 Panic Attack Connections

Note: Wired PA switches connected to the keypad work only with software version 4.03.05 onwards.

Keypad Addressing

The control unit is supplied with one keypad. If you have fitted more keypads, each one must be given a separate "address". Links LK2 to LK4 set the keypad address, as shown in Figure 9.

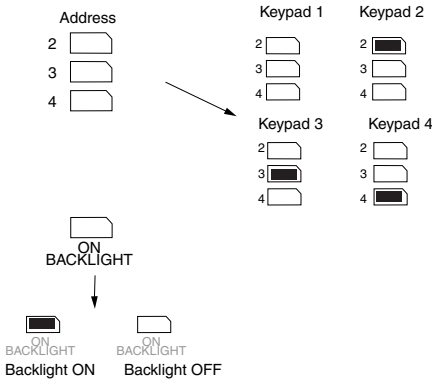


Figure 9. Keypad Addressing

Backlight

When supplied from the factory, the control unit is configured with the backlight On. To turn the backlight Off, remove the jumper from the "ON BACKLIGHT" link, shown in Figure 9.

Connecting Sounders

Figure 10 and the following tables show the wiring required to connect the external sounder (bell box) and optional internal sounders.

Note: If a 2k2 resistor is fitted at the tamper return (TR) terminal at the bell box, use Command 59 to select this EOL mode of termination.

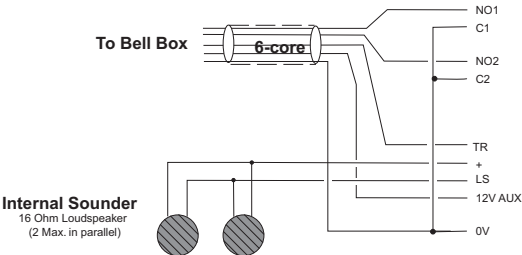


Figure 10. Sounder Connections

Lyntech Ltd - 120 LED/120 Iexon

Control Unit Terminals	NO1	NO2	TR	12V AUX	0V
Bell-Box Terminals	TRG	STRB		HOLD +	

Elmdene Rapier 300, 4000, 5000, 6000; Prima 100-600; Starlight 020

Control Unit Terminals	NO1	NO2	TR	12V AUX	0V
Bell-Box Terminals	-R	-ST	RTN	+H	-H

CQR Security - Sigma, Cequera, Plus and Ultima

Control Unit Terminals	NO1	NO2	TR	12V AUX	0V
Bell-Box Terminals	SIREN TRIG	STROBE TRG	A/T RET SIG	HOLD OFF +VE	HOLD OFF -VE

Ventcroft Security - Vision, Classic and Spirit

Control Unit Terminals	NO1	NO2	TR	12V AUX	0V
Bell-Box Terminals	TRIG -	STB -	RTN	HOLD OFF +VE, STB +VE	HOLD OFF -VE

Flashguard - Xtra

Control Unit Terminals	NO1	NO2	TR	12V AUX	0V
Bell-Box Terminals	TRIGGER	STROB-	SUPPLY -	SUPPLY + STROBE +	TAMP OUT

Intellisense - AG3

Control Unit Terminals	NO1	NO2	TR	12V AUX	0V
Bell-Box Terminals	S-	ST-	TR	V+	V-

Connecting Detector Circuits to the Main PCB

The connectors for the detector circuits, or zones, are on the left-hand edge of the main PCB in the control unit. The table below summarises the number and type of zones that can connect to the main PCB of the control unit. Use Command 21 to specify which of these wiring types you are using. You cannot specify different wiring types for different zones.

If you require more zones, fit one or more expanders as explained on page 22). There can be up to 24 zones on expanders.

Control Unit Zones	Wiring Type
8	four-wire CCL with common tamper
8	two-wire FSL

CCL Connections

Figure 11 shows how to connect four-wire CCL zones.

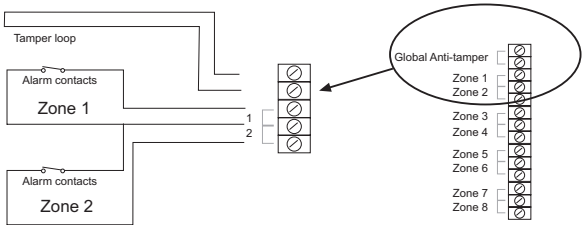


Figure 11. CCL Connections (common tamper)

NOTE: If you use CCL wiring then you must program zone 1 as Normal Alarm (see 9x5x Programming Manual) and fit a wire link to Zone 1 terminals in order to enable the global tamper.

FSL Connections

Each FSL zone is a "Fully Supervised Loop" using a two-wire closed loop. As shown in Figure 12, the loop uses resistors of different values to differentiate between "Circuit" and "Tamper" signals: a 2K2 resistor fitted in series at the end of the wired loop (EOL) and a 4K7 resistor fitted across the alarm contact. With the loop in a normal state and the alarm contacts closed (shorting out the 4K7 resistor), the total resistance of the loop is 2K2. When the alarm contacts open (removing the short from the 4K7 resistor), the resistance of the loop increases to 6K9 and so the control unit detects an alarm condition. If a tamper device opens, the loop resistance becomes infinite (open circuit) and so the control unit detects a tamper signal.

To connect a detector to an FSL loop, you must wire suitable high-tolerance resistors to the detector. Always check resistor colour coding and tolerance before wiring resistors into circuit (see Figure 13).

The wiring resistance of the cable to the detector (including joints) should not exceed 100 ohms. The recommended maximum cable length within a zone is 200–300m.

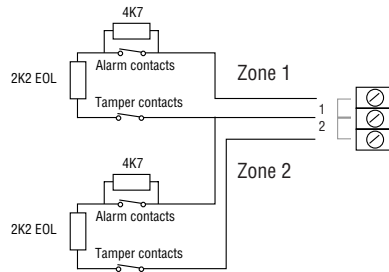


Figure 12. FSL Connections

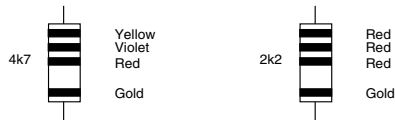


Figure 13. Colour Code for FSL Resistors

Anti-Masking Zone Connections

Note: Connecting an anti masking detector to the 9751 does NOT make the 9752 a Grade 3 control unit.

Some PIR detectors are fitted with an anti-masking facility to detect cases where the detector has been obscured. Depending on the type of detector, the masking status is conveyed by one of two methods:

- Method 1: Using two pairs of contacts at the sensor. One pair reports the alarm/tamper status and the other reports the anti-masking status. This method requires two adjacent zones to be used at the 9752 control unit (one for each pair of contact at the sensor), with the highest zone number for anti-masking. For example, you could use zones 3 and 4, and in this case, zone 3 must connect to the alarm/tamper contacts, and 4 to the anti-masking contacts. The anti-masking zone (zone 4 in this example) must be programmed as type "Anti-Mask". The alarm/tamper zone could, for example, be programmed as type "Normal Alarm".

The anti-masking contacts from the sensor can connect to the 9752 using the CCL, FSL or EOL connection method. In the case of FSL, there would be no in-line tamper contacts (just the 2K2 end-of-line resistor and the 4K7 resistor across the anti-masking contacts). In the case of CCL, the zone's tamper terminals at the 9752 must be shorted.

- Method 2: Applying a specified resistance value to a zone. The zone must be wired as shown in Figure 14.

Note: Depending on the sensor, a 4K4 resistance means either "masked" or "fault". Use command 88 to specify which reporting method to use. All sensors with anti-masking contacts must use a 4K4 resistance for the same meaning (masked or fault).

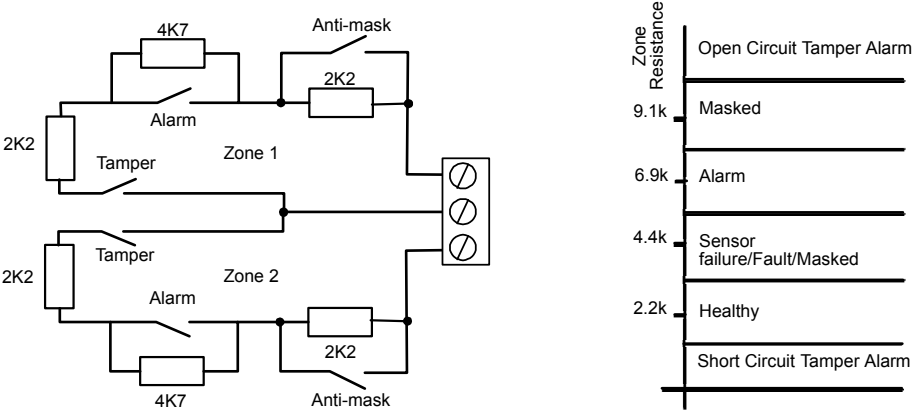


Figure 14. Wiring Zones that use Anti-Masking

Connecting Expanders

9954 Hardwired Expander

The 9954 hardwired expander provides connectors for eight CCL, FSL or EOL zones (EOL zones are not relevant for the 9752). Figure 15 shows the layout of the PCB. See the wiring diagram supplied with the 9954 hardwired expander for more details.

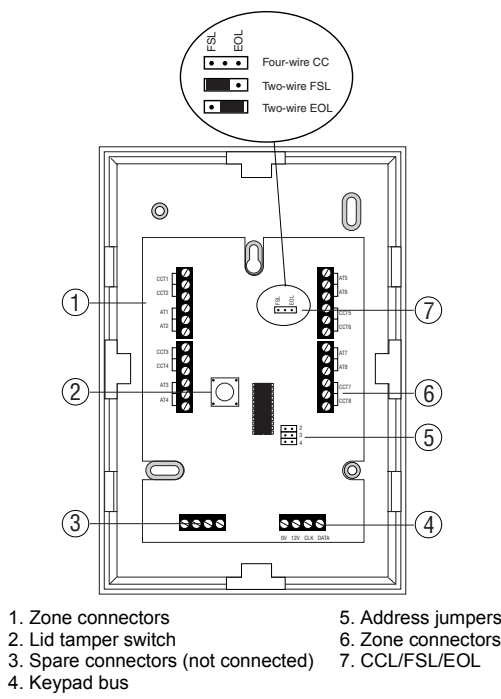
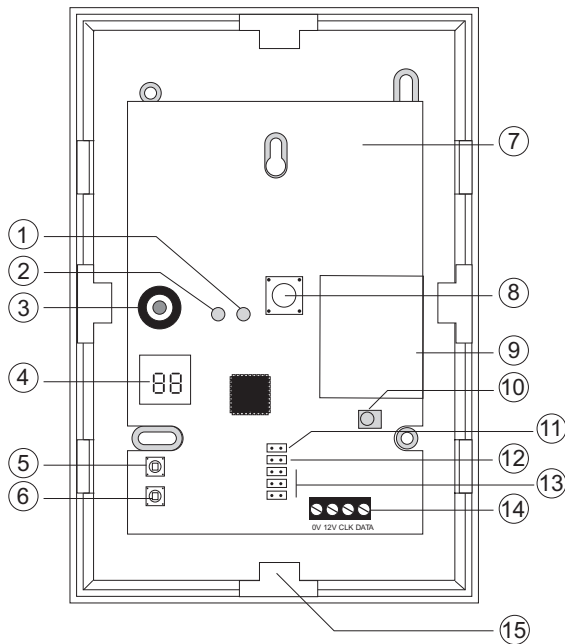


Figure 15. 9954 Expander

RFX08/RFX16 Radio Expander

The RFX08/RFX16 are a Class VI radio expanders. Class VI is the grading given by the British standard for Wirefree Alarm Systems and is required for signalling systems that require a police response. It receives signals from the radio detectors on a frequency of 868.6625MHz.

The RFX08 radio expander supports eight wirefree zones, while the RFX16 supports 16. Figure 16 shows the layout of the PCB.



- | | |
|--------------------------|-----------------------------|
| 1. Red "Fail" LED | 9. Radio section |
| 2. Green "Pass" LED | 10. Learn sensor |
| 3. Sounder | 11. Supervision jumper |
| 4. 2 x 7-segment display | 12. Jamming response jumper |
| 5. Select button | 13. Address jumpers |
| 6. Delete button | 14. Bus connector |
| 7. Built-in aerial | 15. Cable entry |
| 8. Tamper switch | |

Figure 16. RFX08/RFX16 Radio Expander

Refer to the "Installation and Programming Guide" of each version for more details.

Connecting an Expander

Figure 17 shows how to connect an expander to the control unit.

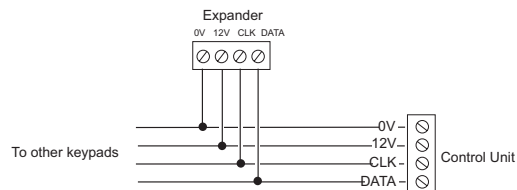


Figure 17. Connecting a 9954 Expander

When fitting a 9954 hardwired expander, make sure that you place the jumper link on the expander in the correct position to select either four-wire CCL, or two-wire FSL (see Figure 18).

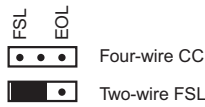


Figure 18. Link Positions to Select Wiring Method

Once you have connected an expander, refer to the instructions supplied with it for connecting hardwired detectors or "learning" radio detectors as appropriate.

Addressing Expanders

If you fit expanders, you must allocate each expander to a specific range of zone numbers. Do not allocate two expanders to the same range of zones. Select the zone numbers by fitting a jumper link to one pair of the set of pins marked "Address" on the expander PCB, as shown in Figure 19.

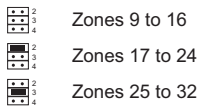


Figure 19. Link Positions to Allocate Expanders to Zones

Note: Other link positions are not valid for the control unit.

Programming Outputs

Control unit panel outputs can be programmed using the commands shown in the table below. Open collector outputs are of a "pull down" type that provides negative-applied control signals; the system adjusts the output polarity when you select the output type.

Output	Type	Command
OP1	voltage-free relay	81
OP2	voltage-free relay	82
OP3	open collector	83

Figure 20 shows some examples of applications for open collector outputs (OP3 is used in these examples).

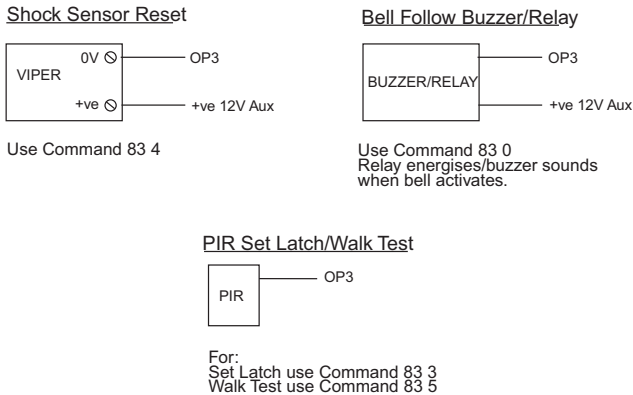


Figure 20. Wiring Examples for Open Collector Outputs

Wiring Keyswitches

To allow a user to set and unset the system using a keyswitch, connect a fixed position or spring loaded (momentary) key switch to a zone input. When programming the control unit select zone type (KM) for momentary or (KF) for fixed position keyswitches. See Command 185 for keyswitch auto-reset.

Figure 21 shows the connections for a keyswitch.

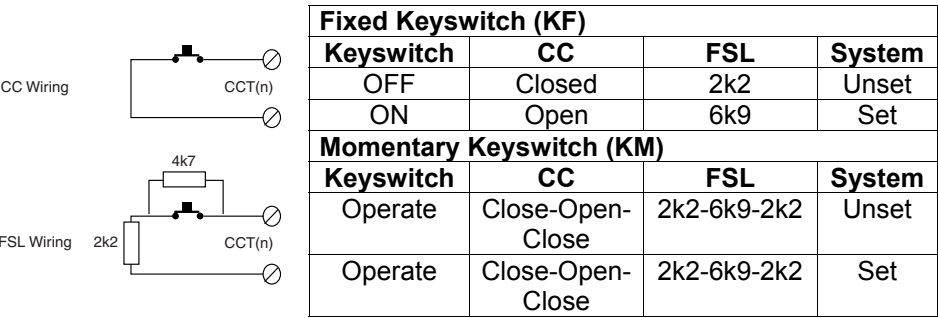


Figure 21. Connecting a Keyswitch

Note:
If you connect a keyswitch as a zone it can be used to set and unset the level to which the zone is assigned.

Communicator

Connecting the Communicator

The control unit has an internal communicator on its main PCB. This is an auto-dialling modem.

If necessary, a standalone communication device can be connected through a wiring harness to interface pins on the main PCB (this is known as a plug-by communicator).

The communicator can be used for:

- Transmitting alarm signals to alarm receiving equipment at a central monitoring station using Scancom Fast Format, Scancom SIA (Security Industry Association) or Contact ID (set with Command 103).
- Connecting to a PC based at a remote engineering centre. Using Scantronic Downloader software, the remote PC can upload and download system parameters (including the event log and diagnostics), set and unset the alarm system, and carry out other special functions.

Telephone Line

Ideally, the internal communicator should be connected to an ex-directory line used exclusively for alarm communications.

If an exclusive line is not available and other apparatus is connected to the line (for example, an answer machine), the internal communicator provides a series connection with line divert for the other apparatus. When triggered, the communicator seizes the line and disconnects the other apparatus. When the communicator shuts down, it reconnects the other apparatus.

Note: If the telephone line is being used for a broadband connection then Cooper Security Ltd recommend that you connect a suitable broadband filter between the control unit and the phone line.

Three-way Calling

The control unit provides a three-way calling facility to make sure the internal communicator can always use a shared telephone line.

To use this facility, the local exchange must provide the three-way calling service on the customer's line.

Line Monitoring for the Internal Communicator

The control unit provides a line monitoring function to check that a telephone line connected directly to the control unit is working, and to indicate a line failure if it is not. While enabled, this function continually checks the line voltage to ensure that the line is connected. If it detects a failure, the system gives the Line Fault Response selected with Command 106.

Test Calls

The control unit can be programmed to make test report calls to an ARC.

"Static" test calls can be programmed to occur at set times or intervals.

"Dynamic" test calls occur 24 hours after the last call made by the unit. See the Programming Guide for details on how to program these functions with Commands 105 and 108.

Statutory Information

Applications

The built-in communicator is suitable for connection to the following types of networks:

- (a) Direct exchange lines (PSTN) supporting DTMF (tone) dialling.
- (b) PABX exchanges (with or without secondary proceed indication).

Note: The built-in communicator is not suitable for connection as an extension to a pay-phone or to 1 + 1 carrier systems.

Approval

The built-in communicator is manufactured to meet all European Economic Area telecommunication networks requirements. However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.

The built-in communicator has been approved for the following usage:

- (a) Automatic call initialisation.
- (b) Operation in absence of indication to proceed.
- (c) Automatic dialling.
- (d) Modem.
- (e) Serial connection.
- (f) Multiple repeat attempts.
- (g) Line status monitoring.

Usage other than approved usage or failure to comply with the installation and programming instructions may invalidate any approval given to the apparatus if, as a result, the apparatus ceases to comply with the standards against which approval was granted. Note the approval label on the main PCB.

In the event of problems you should contact your equipment supplier in the first instance.

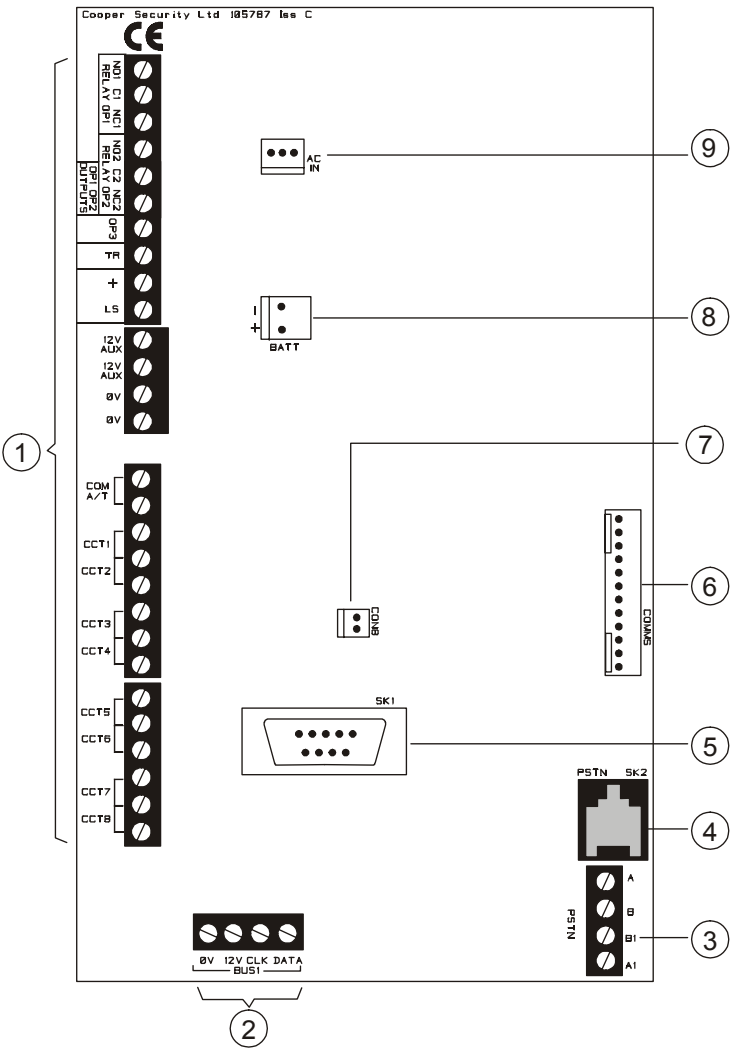
Ringer Equivalence Number

The Ringer Equivalence Number (REN) of the built-in communicator is 1. As a guide to the number of items that can be simultaneously connected to an exclusive line, the sum of the REN values should not exceed 4. A standard telephone (as provided, for example, by BT in the UK) has a REN value of 1.

Safety Notice

Figure 22 identifies connectors for Safety Extra-Low Voltage (SELV) and Telecommunications Network Voltage (TNV) circuits on the control unit's main PCB. These terms are used in accordance with the definitions in Safety Standard EN60 950.

The Installer must ensure that TNV terminals are connected **only** to other circuits designated as TNV circuits (for example, the PTSN) and that SELV terminals are connected **only** to other circuits designated as SELV circuits. Strict adherence to the installation instructions will ensure that the equipment continues to comply with the safety regulations to which it was approved.



- 1. Main connector (SELV)
- 2. Keypad connector (SELV)
- 3. Telephone line connector (TNV)
- 4. RJ11 connector (TNV)
- 5. Local Downloader connector (SELV)
- 6. Wire in comms connector (SELV)
- 7. Lid tamper connector (SELV)
- 8. Battery connector (SELV)
- 9. 21VAC from transformer (SELV)

Figure 22. SELV and TNV connectors

Connecting the Telephone Line

Connecting the telephone line directly to the terminals on the internal communicator, or indirectly through other apparatus, can produce hazardous conditions on the telephone network. Always seek advice from a competent telephone engineer if in any doubt about connecting to these terminals.

Example – connecting a line in the UK:

The internal communicator must be connected to the PABX system by:

- a) If the wiring is owned by British Telecom:
 - British Telecom.
- b) If the wiring is not owned by British Telecom, one of:
 - (i) British Telecom.
 - (ii) The authorised maintainer.
 - (iii) A professional Installer, after 14 days written notice to the authorised maintainer.

To connect the telephone line:

- a) If the telephone line is already terminated with a suitable lead and plug:
 - Insert the plug into the RJ11 connector.
- b) Otherwise (see Figure 23):
 - (i) Using a two-core telephone cable, strip off 5mm and feed the cable through one of the entries in the rear of the control unit. Connect the two cores to terminals A and B on the main PCB.
 - (ii) Connect the other end of the two cores to the corresponding terminals on the BT master box.
 - (iii) If other apparatus is to share the telephone line with the internal communicator (in series), connect the main apparatus to the series switched line connections marked A1 and B1.

Caution: Only one such series apparatus is allowed to be connected between a main apparatus (such as a telephone) and the PSTN.

Ensure that the A and B lines are connected the right way around. The internal communicator continuously monitors the line for ringing tones.

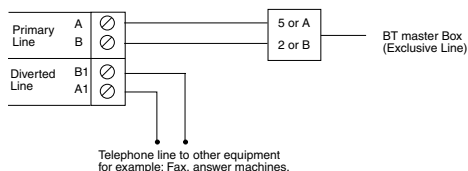


Figure 23. Connecting the Internal Communicator

Fitting a Plug-by Communicator

The control unit can be fitted with a communicator or speech dialler (for example, the Scantronic 8400, 8440, 660 or RedCare STU). Figure 24 shows the connections for the communications wiring harness.

Com Connector Cable, Part No. 485210

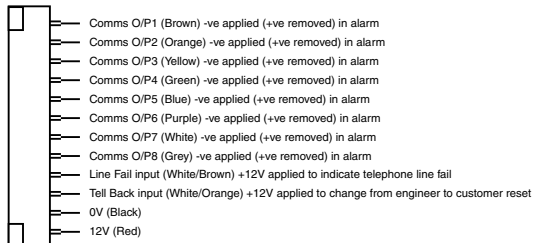


Figure 24. Plug-By Communicator Wiring

Note: Comms O/P4 will be active when the system is unset. This is normal, as a system being unset is equivalent to an alarm signal.

To fit a communicator, follow the instructions below.

Caution: Follow the instructions in the order shown, or you may damage the control unit and/or communicator.

1. Disconnect mains and battery power from the control unit and remove the case lid, if the system has already been installed.
2. Make any necessary connections from the communicator to the communication wiring harness. The default is a positive voltage when the output is inactive but this can be inverted if required using Command 159. *Note that Command 159 inverts all the communications outputs.* Refer to the next section if you are using a dual-path communicator.
3. Plug the Communication Wiring Harness onto the communications connector on the main PCB.

If the system has already been installed:

4. Re-connect the battery.
5. Fit the case lid.
6. Apply mains power.
7. Test communicator operation.

Line Monitoring for a Dual-Path Communicator

If a standalone dual-path (landline and mobile) communication device, such as a RedCARE STU, is connected to the plug-by connector, you need to do the following to obtain correct line fault reporting:

1. Wire a control unit output programmed as type "ATS Test" to the ATS Test input of the communicator. Invert the sense of the output at the control unit if a "positive applied" input sense is used at the communicator.
2. Wire the Line Fault output of the communicator to the Line Fault input of the plug-by connector. The communicator must provide +12Vdc to indicate a line fault (e.g. if the Line Fault output at the communicator uses a relay, connect the common terminal of the relay to +12Vdc and the normally-open terminal to the Line Fault input of the plug-by connector).

The control unit will generate an "ATE L.F. Single" alert if only one of the networks is not available, or "ATE L.F. All" if both networks are not available.

Note: "ATS Test" output type is only available with version 4.02.06 software and higher. This output type is required in order to conform to Form 175 Dual Signalling Line Fault enunciation.

Fitting a Battery

Fit a rechargeable battery into the back of the case. There is space in the case for a 17Ah battery; to use this, order with part number MS100.

Cooper Security Ltd recommend that you fit at least a 7Ah battery.

Initial Start Up

Before applying power to the control unit, ensure that:

- All keypads and expanders have been addressed and connected.
- All external and internal sounders are connected.
- All wired zone circuits are connected.

Then:

1. Connect the battery to the control unit PCB.
2. Briefly short the Kick Start pins together (see Figure 3).
The internal sounder may sound. Ignore any display at this stage.
3. Key in the factory default User access code: 1234.
The internal sounder stops. Ignore any display or lamps.
4. Fit the case lid before applying mains power (this covers the live wiring and closes the tamper switch).
5. Apply mains power.
6. Key in the factory default Engineer Code: 7890.

Notes:

- 1. With software versions earlier than 5.xx.xx key in 0 followed by the default Engineer Code 7890.*
- 2. You do not have to remove the case lid.*

The display shows:

Installer Mode

You are now in installer (programming) mode.

The Programming Guide explains how to program the system. Cooper security recommend that at this point you return the system to its default settings using Command 98. See *Restoring Default Command Settings* in Chapter 1 of the Programming Guide.

Note: You will also need to let the expanders learn the wirefree detectors, and then install the detectors at their selected sites.

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